Black holes, one of the most respectable scientists nowadays and Nobel lecture given at The Royal Swedish Academy of Sciences; what awaits reader in the following fifteen minutes is a very interesting article about Conformal Cyclical Cosmology (CCC) - model proposed by Sir Roger Penrose, rewarded mathematical physicist, Cambridge PhD and emeritus professor at Oxford, who found that a black hole formation is a robust prediction of Albert Einstein`s General theory of relativity.

Despite opinion shared by many scientists that perfect physical symmetry is needed for collapsing matter to form a black hole, with singularity in its middle, and that natural imperfections would prevent the process 2020. Nobel award laureateas Roger Penrose, Reinhard Genzel and Andrea Ghez proved otherwise. Alongside Penrose`s remarkable theoretical work, started more than a half century earlier, the latter two actually discovered a supermassive dense body in the center of the Milky Way galaxy. Wow! They called it Sagittarius A*.

In the opening minutes Penrose explains light cone and mentions Oppenheimer-Snyder paper about collapse of a dust cloud into what we now call a black hole. Work was written under title "On Continued Gravitational Contraction". It was a follow-up to previous Oppenheimer studies concerned with collapse of a neutron star. In an absence of internal pressure, due to energy exhaustion, gravity starts to compress matter. Several effects are being observed: time dilation, redshift and light deflection. Finally, only "thing" that remains is a gravitational field so strong not even massless particles traveling at the speed of light can escape its deadly clutch.

A year after Alfred Einstein released his famous field equations, Karl Schwarzschild calculated a solution for the non-rotating ideal sphere. Results go insane reaching the central point where spacetime curvature and matter density become infinite. This tiny dot is called singularity and it was known to mathematicians much earlier. However, real life existence was unimaginable until Penrose and Hawking announced their singularity theorems regarding black holes and the Big Bang, respectively.

Penrose continues his lecture by explaining the compact nature of a black hole apllying geometrical manifold analogy in a form of Dirac two-spinors, Ricci and Weyl curvature tensors.

Trapped surface, topological anomaly converging on both sides, which illustration was published in 1965., a year after delivering speech at King College in London, reveals how locally positive energy always produces singularity in such an area. Penrose proved that matter doesn`t irregularly swirl around but settles in the middle.

Hawking concludes that diverging (expanding) Universe must have been converged in the beginning, likewise, it must had singularity although it differs to black hole ones mainly because quantum gravity is assimetrical with time progress. Furthermore, Hawking proposes that special sort of thermal radiation enables black holes to eventually evaporate.

Described by Bekenstein–Hawking formula, according to the 2nd law of thermodynamics, black holes also have entropy and it is proportional to a surface size of its event horizon. Almost all cosmic entropy is inside black holes.

Talking about hyperbolic geometry, Penrose makes reference to M. C. Escher art in attempt to describe how different positions in and around black hole affect an observers notion of self and immediate surroundings.

Penrose defines cosmic cycles as a sequence of mutually connected Eons, described by Friedmann–Lemaître–Robertson–Walker spacetime metric, preserving angles in-between.

Some things like massless particles and gravitational waves can pass through the Eon barrier, which is the Big Bang itself (re-occurring), producing an observable signal in a form of temperature variances. Vahe Gurzadyan found exactly this temperature variances in Microwave Anisotropy Probe, corresponding to later Planck CMBR data, at least three concentric rings of it revealing anisotropy and inhomogeneity which have been, as explained by Penrose, supermassive black holes clusters in previous Eon.

As a consequence of expansion, last scattering surface is a transition point when photons finally decoupled and started to travel around making Universe transparent.

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